

annotation system wherein each higher tier server includes more annotation information than lower tier servers.

An exemplary system embodying the present invention includes one or more tier III servers for storing annotations associated with one or more content sources. The annotations stored on the tier III server are indexed on one or more tier II servers. In turn, the location of the index is stored on one or more tier I servers. Inquiries sent to the tier I server identify a relevant tier II server or servers and the tier II server or servers identify a relevant tier III server or servers. Obviously, embodiments of the present invention can include more than three tiers of servers, three being the minimum. In the three-tier embodiment, tier I servers are rapid access servers that, in response to the receipt of a document identifier, quickly advise a user if annotations exist for a content source and the location of an index of such annotations. The tier II servers store the indices and, in response to a user inquiring, provide index information, which identifies the tier III servers storing the annotations.

As can be seen from the above description, the present invention provides multiple tiers of servers that progressively provide more specific information about an annotation (or annotations) associated with a particular content source. It will further be appreciated by those of ordinary skill in the art and others that a multiple-tier annotation system is readily scalable because of its nodal nature. The nodal nature allows each tier level to be expanded (or contracted) as required without requiring that other tiers be simultaneously expanded (or contracted). A multiple-tier annotation system allows frequently accessed lower tiers of servers to provide minimal information and, in effect, filter access to less frequently accessed higher tiers that provide more information. In the example described above, a tier I server can point to a plurality of tier II servers for indexed information about annotations and each tier II server in turn can point to one or more tier III servers where the annotations are located. Such a system distributes both the bandwidth processing and memory loads associated with obtaining progressively more detailed information. Additionally, as noted above, each tier can be expanded as processing loads increase to provide an efficient increase in processing power, without disturbing the overall multiple-tier annotation system, making the system readily scalable. Expansion can occur by changing capacity on a tier level by either changing the capacity of a single server if a tier is formed by a single server, or by changing the number of servers forming a tier if a tier is formed by multiple servers.

The invention is also directed to posting an annotation on a multiple-tier annotation system. A client sends an annotation post to a tier III server that saves a portion of the annotation post and sends a second portion to a tier II server. The tier II server stores the second

portion and sends association information for the annotation to a tier I server. Storing a hierarchy of annotation information on multiple tiers of servers allows queries of the multiple-tier annotation system to be performed more efficiently. In such a system, while lower tier servers get more queries, they also process less information. Thus, query response time is reduced. Higher tier servers, which process more information, get fewer queries since the lower tier servers act as filters for the higher tier servers.

Summary of Cited and Applied References

Summary of Eintracht

Eintracht purportedly teaches a system for collaborative document annotation, employing a central notes server and multiple notes clients. It teaches storing notes such as annotations associated with a document in a notes database on the central notes server. The central notes server also contains a Web server application, which functions to capture requests from one or more notes clients for creating, storing, editing, and retrieving annotations related to specific documents stored on the note server. A notes client functions to display the document that a user wishes to annotate and also provides the tools necessary to permit the user to create, add, delete, retrieve, and store notes.

A synchronization process transmits the annotation generated by the user from the notes client to the central notes server. In response, the central notes server transmits back an acknowledgement along with any new notes that other notes clients may have posted since the last synchronization was performed. As a result, Eintracht enables multiple notes clients to annotate a document asynchronously with respect to each other. When a page is posted to the central notes server by a notes client, the state of the annotation database is synchronized such that all other notes clients can retrieve the current, up-to-date annotations associated with a document.

In summary, Eintracht provides a system that has a central notes server and one or more notes clients. Nowhere does Eintracht teach a multiple-tier annotation system wherein each higher tier server includes more annotation information than lower tier servers. Nor does Eintracht teach posting a hierarchy of annotation information on a multiple-tier annotation system.

Summary of deVries

DeVries purportedly provides a multimedia annotation system in a networked environment. The annotation system of deVries includes a number of servers (a librarian, an index database server, a media database server, etc.). Specifically, deVries is directed to annotating digital video and/or audio streams in an online environment. DeVries has no

provision for increased loads due to potentially vast numbers of annotations or Web pages. DeVries does not disclose a scalable multiple-tier computing system, much less a multiple-tier hierarchical annotation system of the type contemplated by the present invention. Neither does deVries teach posting a hierarchy of annotation information on a multiple-tier annotation system.

The Claims Distinguished

The Office Action has failed to show, and the applicants are unable to find, where any of the cited and applied references, either alone or in combination, disclose, teach or suggest the subject matter of the claimed invention. Among other differences, none of the cited and applied references teaches, discloses, or suggests storing annotations on the servers of a higher tier and information about annotations on the servers of lower tiers of a multiple-tier hierarchical annotation system. As noted above, neither Eintracht nor deVries provides readily scalable systems, much less scalable systems employing multi-tier hierarchical annotation servers of the type contemplated by the present invention. As discussed more fully below, Claims 1-28 clearly recite scalable methods, computer-readable media, or computing systems not taught or even remotely suggested by Eintracht or deVries, taken alone or in combination.

Rejection of Claims 1-9 Under 35 U.S.C. § 103(a)

Claim 1, in its present form, reads as follows:

1. A computing system for managing annotations, the computing system comprising:
 - a tier III server to store data for the annotations;
 - a tier II server to maintain an index of the data for the annotations stored on the tier III server; and
 - a tier I server to determine if a content source has data indexed by the tier II server.

Claim 1 recites a multiple-tier computing system that provides an easily scalable way of retrieving annotation information. Neither of the cited references teaches the subject matter recited by Claim 1. As described above, Eintracht is directed to a system consisting of a central notes server and multiple notes clients. Nowhere does Eintracht teach a multiple-tier computing system comprising a tier I server, a tier II server, and a tier III server. While Eintracht appears to teach a notes database that tracks all annotations and other activities, as the Office Action correctly concluded, Eintracht does not teach a notes database for storing annotations as a tier III server.

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The Office Action recognized that Eintracht fails to teach a tier III server and suggests that deVries makes up for this failure. Applicants respectfully disagree. As noted above, Claim 1 recites a tier III server to store data for the annotations. The cited and applied reference, deVries, contains no teaching or suggestion of a tier III server. The Office Action appeared to equate deVries' teaching of an index database server to the tier III server recited in Claim 1. Applicants respectfully disagree. The index database server of deVries is not a tier III server of the type recited in Claim 1. DeVries' index database server is an initial query server (Col. 7, lines 27-45), not one of the three tier servers in a multiple-tier annotation server system as recited in Claim 1. Further, there is no teaching or suggestion that the deVries index database server has any relations with a tier I or a tier II server.

In summary, none of the cited references discloses or suggests, alone or in combination, the multiple-tier computer system recited in Claim 1. Thus, applicants submit that Claim 1 and all the claims dependent therefrom (Claims 2-9) are clearly allowable.

Because Claims 2-9 include additional recitations that further distinguish them from the teachings of Eintracht and deVries, Claims 2-9 are also submitted to be allowable for additional reasons. For example, Claims 4-6 recite that each of the tier I, tier II, and tier III servers comprises a plurality of servers. The Office Action suggested that Eintracht teaches the subject matter recited by Claims 4-6. Applicants respectfully disagree. Applicants have been unable to locate any pertinent subject matter in the portion of Eintracht (Col. 8, lines 44-46) referenced in the Office Action. In this portion of text, Eintracht notes that the Eintracht invention can be implemented to operate over an intranet, Extranet, or the Internet. In the context surrounding this portion of text, Eintracht teaches that the central notes server functions in conjunction with a Web server and remote file servers. Eintracht does not teach a multiple-tier computing system comprising a tier I server, a tier II server, and a tier III server, where each of the tier I, tier II, tier III servers comprise a plurality of servers as recited in Claims 4-6. Accordingly, Claims 4-6 are submitted to be allowable for this reason as well.

Claim 7 recites a client software stored on a tier III server to allow a user to view a type of annotation. Contrary to what the Office Action suggested, Eintracht does not teach this subject matter. The Office Action equated Eintracht's teaching of a database to be a useful tool for tracking all annotations and other activities with the subject matter recited in Claim 7. Applicants respectfully disagree. The teaching of a database as a useful tool for tracking all annotations and other activities does not teach or suggest client software stored on a tier III server to allow a user to view a type of annotation. Nowhere does Eintracht disclose, teach, or

suggest a tier III server, nor client software stored on a tier III server that allows a user to view a type of annotation. Accordingly, Claim 7 is submitted to be allowable for this reason as well.

Rejection of Claims 10-21 Under 35 U.S.C. § 103(a)

Independent Claim 10, in its present form, reads as follows:

10. A computerized method of posting an annotation, the method comprising:
 sending an annotation post from a client to a tier III server;
 storing a portion of the annotation on the tier III server;
 sending a second portion of the annotation from the tier III server to a tier II server;
 storing the second portion of the annotation on the tier II server;
 sending association information from the tier II server to a tier I server;
and
 storing the association information on the tier I server.

Claim 10 recites a method of posting a hierarchy of annotation information by a client on the various tiers of a multiple-tier annotation system. As the above discussion of Claims 1-9 shows, none of the cited and applied references teaches a multiple-tier annotation system. Further, none of the cited and applied references teaches the posting of a hierarchy of annotation information. Applicants have been unable to locate any pertinent subject matter in the portions of Eintracht referenced in the Office Action. For example, in these portions of text, nowhere does Eintracht teach "sending a second portion of the annotation post from the tier III server to a tier II server that is **separate and distinct from** the tier III server." Further, nowhere does Eintracht teach storing various portions of an annotation on multiple tiers of servers that are separate and distinct from each other.

Further, while correctly recognizing that Eintracht fails to teach a tier III server, the Office Action suggested that deVries makes up for this failure. Applicants respectfully disagree. As the above discussion for Claims 1-9 shows, deVries' index database server is not a tier III server of the type recited in Claim 10.

Therefore, applicants assert that the subject matter of Claim 10, taken as a whole, is clearly not taught or suggested by the cited and applied references and, thus, Claim 10 is clearly in condition for allowance. Since Claims 11-21 are dependent from Claim 10, Claims 11-21 are submitted to be allowable for at least the same reasons noted above.

Because Claims 11-21 include additional recitations that further distinguish them from the teachings of the cited and applied references, they are submitted to be allowable for additional

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reasons. For example, Claim 12 recites "notifying the client of a successful post to the tier III server." None of the Eintracht and deVries references teaches, discloses, or suggests notifying a client of a successful post to a tier III server. In fact, there is no teaching of notifying the client of a successful post of an annotation to any server as far as the applicants have been able to determine. Applicants have not been able to locate any pertinent subject matter in the portions of text in either Eintracht or deVries referenced by the Office Action. Eintracht's teaching of communication with a notes client does not teach "notifying the client of a successful post to the tier III server." Accordingly, Claim 12 is submitted to be allowable for this reason as well.

Similarly, Claim 14 recites "notifying the tier III server of a successful post to the tier II server." As none of the Eintracht and deVries references teaches, discloses, or suggests such communication between multiple-tier annotation servers, clearly none of the references teach notifying a tier III server of a successful post to a tier II server. Therefore, Claim 14 is submitted to be allowable for this reason as well.

Claim 15 recites notifying a tier II server of a successful post to a tier I server. As already noted above, none of the Eintracht and deVries references teaches a tier I server or a tier II server. Therefore, Claim 15 is submitted to be allowable for this additional reason.

Rejection of Claims 22-24

Independent Claims 22-24, in their present form, read as follows:

22. A computer-readable medium having stored thereon a "client-to-tier III server" data structure comprising:

- a first field containing data representing a context document identifier;
- a second field containing data representing a body of the annotation;
- a third field containing data representing generic properties of the annotation;
- a fourth field containing data representing type specific properties of the annotation;
- a fifth field containing data representing a URL for a tier III server for receiving and storing a portion of the post of the annotation;
- a sixth field containing data representing a URL for a tier II server for receiving and storing a portion of the post of the annotation; and
- a seventh field containing data representing a URL for a tier I server for receiving and storing associations for the annotation.

23. A computer-readable medium having stored thereon a "tier III server-to-tier II server" data structure comprising:

- a first field containing data representing a context document identifier;

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a second field containing data representing generic properties of the annotation;

a third field containing data representing a URL for a tier III server for receiving and storing a portion of the post of the annotation;

a fourth field containing data representing an identifier for the portion of the post of the annotation stored on the tier III server;

a fifth field containing data representing a URL for a tier II server for receiving and storing a portion of the post of the annotation; and

a sixth field containing data representing a URL for a tier I server for receiving and storing associations for the annotation.

24. A computer-readable medium having stored thereon a "tier II server-to-tier I" server data structure comprising:

a first field containing data representing a context document identifier;

a second field containing data representing an indexing identifier of the annotation;

a third field containing data representing a URL for a tier II server for indexing the annotation; and

a fourth field containing data representing a URL for a tier I server for receiving and storing associations for the annotation.

As already discussed above with regard to independent Claims 1 and 10, none of the Eintracht and deVries references teaches, discloses, or suggests a multiple-tier annotation system with tier I, II, and III servers, let alone such a system wherein the URLs of the tier I, II, and III servers are distinct from one another. As the Eintracht and deVries references are not directed to a multiple-tier annotation system that is readily scalable in order to handle changes in the number of users, it is apparent that none of the Eintracht and deVries references renders the data structures recited in these computer-readable medium claims obvious under 35 U.S.C. § 103(a). Accordingly, Claims 22-24 are submitted to be allowable. Claims 22-24 are submitted to be allowable for at least one additional reason. More specifically, Claims 22-24 recite data structures that relate to the posting of annotations on a multiple-tier annotation system. As none of the cited and applied references teaches or suggests such annotation posting, as discussed above with regard to Claim 10, none of the cited and applied references teaches or even remotely suggests the data structures and their respective data fields stored on computer-readable medium as recited in Claims 22-24. For this reason as well, Claims 22-24 are additionally submitted to be allowable.

Rejection of Claims 25-28 Under 35 U.S.C. § 103(a)

Independent Claim 25, in its present form, reads as follows:

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25. A computerized method for managing annotations, the method comprising:

storing within a tier I server a plurality of associations with references to a tier II server for each association;

storing within a tier II server an indexing identifier for each one of the annotations and storing within the tier II server a reference to a tier III server for each one of the annotations;

storing within a tier III server content for each one of the annotations;

receiving by the tier I server from a client a context document identifier;

and

providing a first response to the client from the tier I server, wherein the first response comprises one for more associations for the context document identifier and the reference to the tier II server for each one of the associations.

As already discussed above with regard to Claim 1 and Claim 10, none of the Eintracht and deVries references teaches, discloses, or suggests a multiple-tier hierarchical annotation server system with separate and distinct tier I, II, and III servers, let alone "a plurality of associations with reference to a tier II server for each association." Clearly, none of the Eintracht and deVries references, alone or in combination, renders Claim 25 obvious. Therefore, applicants assert that Claim 25 is allowable. Since Claims 26-28 are dependent from Claim 25, Claims 26-28 are submitted to be allowable for at least the same reasons noted above.

Claims 26-27 include additional recitations that further distinguish them from the teaching of Eintracht and deVries and, thus, are submitted to be allowable for additional reasons. For example, Claim 26 recites that the tier II server receives from the client a "selection identifying one of the association for the document identifier" and provides the client a second response. The Office Action suggested that Eintracht teaches the subject matter recited by Claim 26. Applicants respectfully disagree. Applicants have been unable to locate any pertinent subject matter in the portion of Eintracht (Col. 10, lines 24-26) referenced in the Office Action. In this portion of text, Eintracht describes transferring requests to aliased URLs to the central notes server, instead of the central notes server receiving URLs, as suggested by the Office Action. Further, Eintracht does not teach providing a second response to the client, let alone a second response that "comprises a header for each of the annotations associated with the document identifier and the reference to the tier III server for each annotation." The second response improves the efficiency of the present invention. A first response is received from a tier I server, which gives a simple and quick response indicating whether annotations exist, while the second response from the tier II server gives further information and identification of a tier III server that stores the associated annotation. Such behavior and capabilities are not taught,

disclosed, or suggested by the Eintracht and deVries references. Accordingly, Claim 26 is submitted to be allowable for this reason as well.

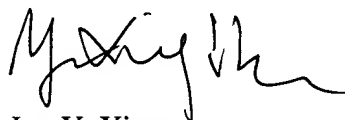
Claim 27 includes the recitation of a "providing a third response to the client from the tier III server." Since none of the Eintracht and deVries references teaches a third response, Claim 27 is submitted to be allowable for this reason as well.

CONCLUSION

In view of the foregoing comments, applicants respectfully submit that all of the claims in this application are clearly allowable in view of the cited and applied references. Consequently, reconsideration and reexamination of this application, allowance of rejected Claims 1-28, and passage of this application to issue at an early date are respectfully solicited. If the Examiner has any questions or comments concerning this application, the Examiner is invited to contact the applicants' undersigned attorney at the number below.

Respectfully submitted,

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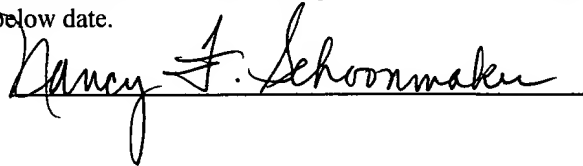
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